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wishing to examine it. Further evidence was obtainable only in the locality whence it came. No opportunity to seek such evidence has yet occurred during the short period in which the skull has been in the possession of the Peabody Museum.

The sixth summer meeting of "The American Association to Promote the Teaching of Speech to the Deaf" was held at the Clarke School for the Deaf, Northampton, Mass., in June, 1899. In his presidential address Dr. Alexander Graham Bell reviewed the history of the association from the time of its foundation in 1890. A condensed account was also given of the present condition of instruction in speech-teaching in the United States. Only a few years ago silent methods of instruction of deaf-mutes were everywhere in vogue; now speech is used as a means of instruction with the majority of such pupils (53.1 per cent), and the total number taught speech and speech-reading amounts to 6460, or 61.4 per cent of the whole. There is a steady increase in the percentage of speech-teaching, and Dr. Bell believes that the time is not far distant when speech will be taught to every deaf child in America. In a reprint from *The Association Review*, Dr. Bell adds a number of tables of statistics compiled from the *American Annals of the Deaf*. These show the number of schools, pupils, teachers, and give lists of the schools, with their location, official names, directors, etc.

F. R.

GENERAL BIOLOGY.

A Study of Heredity among the Deaf.¹—We are indebted to Professor Edward Allen Fay for an important contribution to the data of heredity. The collection of the large mass of material and publication of the extensive tables were made possible by a liberal use of the funds of the Volta Bureau, an institution endowed by Dr. Alexander Graham Bell "for the increase and diffusion of knowledge relating to the deaf."

The inquiry was begun in 1889. Circulars containing questions to be answered were distributed widely among heads of schools for the deaf, the deaf themselves, and their relatives and friends. Facts were gathered also from journals for the deaf, school reports, and

¹ Fay, E. A. *Marriages of the Deaf in America*. Washington, The Volta Bureau, 1898 (1899). vii, 527 pp., 8vo.

returns of census enumerators. The result was that more or less complete returns were received of 4471 marriages in which one or both of the partners were deaf. After deducting marriages of less than a year's standing, the total number of marriages of which the results in regard to offspring are reported is 3078, and number of children is 6782. These numbers are large enough to promise fairly trustworthy results.

The first third of the book is taken up with a discussion of the results, and the rest is devoted to a tabular statement giving the details in regard to each marriage. This is followed by an index.

Within the space of a review one cannot do more than refer to some of the conclusions which are of especial interest. Passing over the statistics in regard to the relative fertility of the deaf and the hearing, the proportion of deaf children in the total marriages of the deaf, etc., we come to a comparison between the proportion of deaf children born when both parents are deaf and the number when one parent only is in this condition, and we find the surprising result that in the first case there are only 8.458 per cent of deaf children, while in the second there is a considerably larger percentage, namely, 9.856. This would seem to upset all one's ideas of heredity. But the anomaly is explained to a great extent when we take into consideration the nature of the deafness, whether congenital or acquired, the ancestry of the parents, and their relationship to one another.

The author calls attention to the fact that deafness may be due to a number of causes, such as various infectious diseases, malformation of various auditory organs, and the like. It is not deafness as such that is inherited, but some tendency to disease, or some abnormal habit of growth. This makes it difficult to distinguish deafness which is congenital and that which is adventitious, even when the patient can be examined; and it is still more difficult to make the distinction from the reports of cases such as were used in this inquiry. Therefore it is not a matter of surprise that the author fails to give a good definition of the two kinds of deafness.

Notwithstanding this uncertainty of definition, the results as to the relative frequency of deafness in children of congenitally deaf parents and parents adventitiously deaf are decidedly interesting. Thus it is found that where both parents are congenitally deaf the percentage of deaf children is 25.931; where one parent is congenitally deaf and the other adventitiously deaf it is 6.538; while where both parents are adventitiously deaf it is but 2.326. But where one parent is congenitally deaf and the other hearing 11.932 per cent of the children

are deaf; and when one parent is adventitiously deaf and the other hearing the percentage is 2.244. Here appears again the surprisingly large number of deaf children of hearing parents. But it is very evident that adventitious deafness is transmitted much less readily than congenital deafness. Indeed, it cannot be proven by these statistics that the former is ever inherited, because of the unknown error in the classification of the two varieties of deafness.

The statistics show that the presence of deafness among the relatives of the parents increases very largely the chances that deaf children will be produced, and this is, of course, what would be expected. Taking the cases where both parents have deaf relatives (not including descendants), the percentage of deaf children where both parents are congenitally deaf is raised to 30.303; where both parents are deaf but only one congenitally deaf the percentage is 10.903; where one parent was congenitally deaf and the other hearing there is again a large percentage, 24.286; and where both partners are adventitiously deaf there are 9.649 per cent of deaf children. Now, taking the cases where only one parent had deaf relatives, the percentages are 20.0, 5.536, 11.864, and 2.801, respectively. Finally, where neither partner had deaf relatives the figures are 4.167, 1.515, 15.789, and 0.364. In this last series the first and third percentages represent one child and three children, respectively, and the third one would be much reduced if one doubtful case were discarded.

Over 45 per cent of the hearing parents whose family history is recorded had deaf relatives, while this is true of only about 32 per cent of the adventitiously deaf. This fact, taken in connection with the evidence as to the effect of history of deafness in the family of the parents in increasing the chances of deafness in the children, seems to explain to a great extent the large proportion of deaf children of hearing parents compared with those of the adventitiously deaf which appears in the general statistics. But even when the factor of family history is taken into account, as in the tables summarized in the preceding paragraph, there is still to be found a remarkably large proportion of deaf children of hearing parents. The author attempts to explain this on the ground of consanguinity. When both partners are deaf the largest percentage of deaf children is obtained from consanguineous marriages, 32.258 per cent; and in consanguineous marriages where one partner is deaf and the other hearing the percentage is nearly as large, 29.851. In cases of deafness, then, the peculiarity of the parents seems to be more strongly

inherited when they have a common ancestry. Now it is found that of the 3242 marriages where both partners were deaf only 12, or 0.370 per cent, were consanguineous; while of the 894 marriages where one partner was deaf and the other hearing 18, or 2.013 per cent, belonged to this class. The 20 deaf children born from the latter class of consanguineous marriages constitute 13.2 per cent of the total 151 deaf children born from marriages in which one of the partners was a hearing person; while the 10 deaf children from the former class of marriages constitute only 2.3 per cent of the total 429 deaf children having both parents deaf. It is difficult to see why consanguinity should so intensify hereditary characteristics; but if it does do so, then this large proportion of consanguineous marriages between the hearing and the deaf accounts to some extent for the large proportion of deaf children. How far this goes to explain the facts can only be determined mathematically; and this the author does not attempt.

It is to be regretted that the author did not inquire more particularly in regard to the condition of the parents of the deaf married persons. The parents were simply included in the general inquiry concerning "other relatives," with the result that on examining the Tabular Statement of Marriages one is disappointed to find that it is often impossible to tell whether the parents were hearing or unreported. If this point had been attended to, these statistics might have been expected to furnish an important confirmation, or the reverse, of Galton's law of filial regression.

R. P. B.

Blatchley's "Gleanings from Nature." — Mr. Willis S. Blatchley, State Geologist of Indiana, has published in book form, under the head of *Gleanings from Nature*, a number of fragments of popular science contributed by him to the press of Indiana and to Appleton's *Popular Science Monthly*.

The essays are truthful rather than literary, and they give vivid touches of nature, the results of close and sympathetic observation.

The first essay discusses charmingly the harbingers of spring in Indiana — the maples, skunk cabbage, trillium, yellow-hammer, fox sparrow, and the birds and flowers that mark the end of winter. Other topics discussed are "Two Fops among the Fishes," "Snakes," "The Gnat Catcher," "The Old Canal," "The Iron Weed," "The Indiana Caves and their Inhabitants," "The Tamarack Swamp," "The Katyids," "The Winter Birds," and "How Animals and Plants spend the Winter."